PIPE MEDICAL ENGINEERING

MINIMALLY INVASIVE DIAGNOSTICS – FUNCTIONAL MICRO-IMPLANTS

Implantable micro drug delivery system based on electrically conductive polymers (ZEE20050819)

This implantable, highly precise and programmable micro pump opens up new prospects for innovative therapies. It is propelled by piezoelectric actuators at very low voltage (± 2 V) without need for salt ion additions. The pressure spectrum covers the physiological human pressure zone up to 225 mmHg, which enables applications in humans. This new dosage element works autonomously and the reservoir can be refilled from the outside by means of a hypodermic needle. Plausible applications would be as drug delivery systems in cancer and pain therapy or in pharmaceutical studies.

IP-Holder: Albert-Ludwigs-University Freiburg/Germany

Status: Granted patents DE 102006003744 B3, EP 1989447

A laboratory prototype exists.

In situ vital parameter monitoring system (ZEE20051102)

This implantable, autonomous sensor system is suitable for long-term in vivo monitoring of vital parameters, i.e., oxygen saturation, pulse rate and blood pressure for high-risk heart patients. An elastic, biocompatible silicone sensor-integrated cuff is mounted around arterial blood vessels. The blood pressure is determined using a highly elastic stretch-sensor, measuring blood vessel changes without affecting blood flow. A second elastic cuff harbors the optical components - two light-emitting diodes and a detector for oxygen determination.

IP-HOLDER: Albert-Ludwigs-University Freiburg/Germany

Status: The German patent was granted DE 102006022854 B4

A model exists. Technical feasibility was proven.

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Implantable surveillance system for early relaxation detection of metallic endoprosthesis (ZEE20070314)

This surveillance system is able to identify relative movements between bone and endoprosthesis. An implantable eddy current sensor is connectable with an external data analyzer. Verification of a correct prosthesis fit is performed in vitro. From outside, eddy currents are generated in the metallic endoprosthesis by high frequency excitation of the sensor coil, resulting in induction of an opposing magnetic field, which in turn attenuates the primary field inside the sensor coil. The attenuation corresponds with a change of the ohmic resistance, which is a direct measure of the distance between sensor element and prosthesis, and therefore is an early indicator for a possible relaxation. The surveillance system works continuously with long-term (10 year) stability. Early relaxation detection of a hip prosthesis ranges from the 10- 20 micrometers of developing gaps, can sort out unfavorable systems early, save x-ray examinations or facilitate re-fixing processes by immediate, early therapeutic measures and thereby minimize subsequent operations.

IP-Inhaber: Albert-Ludwigs-University Freiburg/Germany

Status: Applied for a German Patent DE 10 2008 005 180 A1.

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